In-Office Cost System (IOCS) Documentation

I. PREFACE

A. Purpose and Content

USPS-FY22-37 documents the In-Office Cost System, including statistical design for and estimation of in-office labor costs. It also presents FY22 CVs (coefficients of variation) and confidence intervals for the estimates.

B. Predecessor Document

Documentation of statistical design and estimation were provided previously in Docket No. R2006-1, USPS-LR-L-9 and ACR2021, USPS-FY21-37.

C. Corresponding Nonpublic Document

USPS-FY22-NP21, In-Office Cost System (IOCS) Documentation.

D. Methodology

For FY22, IOCS methodology is the same as described in Docket ACR2021: USPS-FY21-37.

Effective FY22 Quarter 2, IOCS phone readings in Computerized On-Site Data Entry System (CODES) started asking respondents with access to MIO (Mobile Delivery Device – In-Office, MDD-IO) at Post Offices/Stations/Branches to scan the mailpiece barcodes if available.

E. Input/Output

Cost estimates from the In-Office Cost System rely on no input data. Outputs from the In-Office Cost System are used as inputs to:

USPS-FY22-1	• FY 2022 Public Cost and Revenue Analysis (PCRA) Report
USPS-FY22-7	• Cost Segment 3 Cost Pools & Other Related Information (Public Portion)
USPS-FY22-19	• FY 2022 Delivery Costs by Shape
USPS-FY22-31	• FY 2022 CRA Model (Model Files, Cost Matrices, and Reports) (Public Version)
USPS-FY22-32	• FY 2022 CRA “B” Workpapers (Public Version)

II. ORGANIZATION

This document describes the statistical design of IOCS, and provides information on the system’s programs.

Section III: Overview of IOCS
Section IV: Statistical Study Design of IOCS Non-Cluster
Section V: Statistical Study Design of IOCS-Cluster

Section VI: Program Documentation

In addition, electronic data files, programs, data dictionary, flowchart, CVs and data regarding Special Purpose Routes are provided in the accompanying zip file, described in Appendix A.

III. OVERVIEW

The In-Office Cost System (IOCS) is a continuous, ongoing probability sample of work time to estimate costs of various activities performed by clerks, mail handlers, city carriers, and supervisors. Although the Postal accounting system tracks costs for various categories of employees, it does not identify labor costs by individual product because employees are simultaneously processing more than one product in most operations. The IOCS is designed to supplement the accounting system data by sampling employees at randomly selected points in time throughout the year. When an employee is sampled, the activity of the employee at that point in time is recorded directly into a laptop computer using the Computerized On-Site Data Entry System (CODES) IOCS and IOCS-Cluster software.

These sample data, in combination with data from the accounting system, the Management Operating Data System (MODS) system, and the Time and Attendance Collection System (TACS) are used to produce detailed estimates of attributable costs for various activities.

A. Use of IOCS Data in Distribution of Costs to Mail Categories

IOCS estimates are used to distribute volume variable costs to products for cost segments 3 (clerk/mail handler-CAG A-L Post Offices) and 6 (city carrier, in-office). The data are generally tabulated at the "cost pool" level for costing purposes; see USPS-FY22-7 for clerks and mail handlers, and USPS-FY22-32, CS06&7 workbook for carriers.

B. Other Uses of IOCS Data for Costing

Cost estimates from the IOCS are also used to develop accrued costs for segment 2 (supervision of mail processing, window service, admin support…), segment 6 (city carrier in-office), and segment 7 (city carrier street time). For example, the accounting system provides total accrued costs of city carriers (Cost Segments 6 and 7 combined), and an IOCS Cluster estimate of the proportion of city carrier cost while in the office is used to split accrued costs between segments 6 and 7 for letter routes.

In addition, the distribution of volume variable costs in other segments and components relies indirectly on IOCS. For example, volume variable rental costs for window service space are distributed as window service in segment 3.2, and the volume variable costs of segment 3.2 are distributed to products based on IOCS estimates.

C. City Carrier Special Purpose Routes

For city carriers assigned to Special Purpose Routes (SPR), this folder provides total costs for the SPR cost pools, and total workhours by season to enable the appropriate weighting of SPR volume-variability factors; see USPS-FY22-32, CS06&7 workbook.

These totals are developed only from TACS and accounting data, and do not use sample data from IOCS.

IOCS manual sampling is comprised of three subsystems. IOCS Non-cluster (“traditional” IOCS) samples individual employees at one specific moment in time, scheduling at most one reading on the employee within a single pay period. It is used for sampling clerks, mail handlers and supervisors. In contrast, IOCS-Cluster samples clusters of employees within specified blocks of time. IOCS-Cluster morning tests sample the city carriers in the same office on the same morning. Over the course of the morning, when city carriers are typically working on the premises, multiple readings are conducted on a subset of the office’s carriers by a data collector who is also on-site. IOCS-Cluster afternoon tests sample city carriers in the same district during a one-hour block of time. Over the course of the hour, a data collector conducts telephone readings on up to thirty city carriers, who are typically on the street during that hour.

IV. STATISTICAL STUDY DESIGN – IOCS NON-CLUSTER

The universe under study in IOCS Non-Cluster consists of all the work time, during a Fiscal Year, of all employees in three employee crafts: 1) Clerks, 2) Mail Handlers, and 3) Supervisors.[1] The IOCS Non-Cluster is a three-stage probability sample of employee work time, stratified by employee craft and by Cost Ascertainment Group (CAG). The details for each of the stages are described below:

A. First Stage Sample

The first stage sampling unit is a post office or plant, represented by a lead finance number. The IOCS Non-Cluster office frame consists of all lead finance numbers that contain employees eligible for sampling in IOCS Non-Cluster, together with their associated stations, branches and remote post offices. Finance numbers are stratified by size into CAGs, where the measure of size for each office is its total revenue two years previous. The office frame consists of finance numbers whose CAG status is at L or above. Stations and branches have the same CAG as their lead finance number, while remote post offices retain their own CAG. The Network Distribution Centers (NDC) and processing and distribution facilities (P&DC, AMC, AMF and some P&DF) are considered as part of the stratum of largest (CAG A and B) offices.

All offices that were in CAG A or CAG B prior to 1992 and remained in CAGs A or B are included in the sample. In each of the other CAGs, a panel of offices is used to represent the office frame.

Table 1 summarizes the IOCS Non-Cluster first-stage sample and universe sizes.

Table 1
IOCS Non-Cluster
First-Stage Universe and Sample
Fiscal Year 2022

CAG Group	Office Frame	Sampled Offices
A/B	2,876	2,561
C	1,548	602
D	902	148
E	1,651	248
F	2,131	127
G	3,283	135
H/J	6,676	468
K/L	8,261	539
Grand Total	27,328	4,828

[1] This group includes professional, administrative and technical staff.

B. Second Stage Sample

The second stage sampling unit is the employee-week. Employees are stratified by craft within CAG. Sampling rates are specific to craft-CAG combinations. In order to generate more accurate cost estimates for international products, clerks and mail handlers in offices with high volumes of international mail are sampled at higher rates. Within each office, a higher sampling rate is assigned to a group of pay locations with a historically higher incidence of handling international mail. For these offices, the weekly employee sampling rates ranged from 0.03 to 0.50, as compared to the default rate of 0.03 for CAG A clerks and mail handlers.

Table 2 summarizes the employee sampling rates and Table 3 shows the sample sizes by craft and CAG group.

Table 2
IOCS Non-Cluster
Employee Sampling Rates by CAG and Employee Craft

CAG	Clerk - Regular	Clerk - Other	Mail-Handlers	Super-visors
A/B & NDCs	.03	.03	.03	.04
C	.09	.09	.09	.10
D	.17	.17	.17	.10
E	.15	.15	.15	.16
F	.50	.50	.50	.40
G	.50	.50	.50	.50
H/J	.50	.50	.50	.50
K/L	.50	.50	.00	.00

Table 3
IOCS Non-Cluster
Number of Readings, Craft by CAG Group
Unweighted Tallies
Excludes Generated Records
Note: BF4 includes nonscheduled leave, samples not received, at lunch, etc.

CRAFT		A/B	C	D	E	F	G	H/J	K/L	Grand Total
1A Supervisor		14,280	3,653	1,039	1,417	1,304	502	119	1	22,315
1B Supervisor	BF4	10,699	2,554	764	1,172	1,196	437	107	39	16,968
2A Clerk-Reg		49,269	9,401	5,055	5,201	5,162	1,514	2,430	3,227	81,259
2B Clerk-Reg	BF4	64,961	8,647	4,617	4,546	4,412	1,304	1,939	1,621	92,047
3A Clerk-Sub		10,504	1,730	1,074	1,541	2,578	2,630	6,079	6,115	32,251
3B Clerk-Sub	BF4	23,542	2,372	1,415	1,823	3,293	3,326	8,729	3,277	47,777
4A Mail Handler		39,020	309	145	16					39,490
4B Mail Handler	BF4	61,007	341	176	21					61,545
Grand Total		**273,282**	**29,007**	**14,285**	**15,737**	**17,945**	**9,713**	**19,403**	**14,280**	**393,652**

C. Third Stage Sample

The third stage of selection is the instant of time, within the selected week, for which the employee is scheduled for observation. Within the selected week, a day is first selected randomly with the probability proportional to the number of employees who work that day. The selection probabilities are 15/90 for a regular working day (Monday to Friday), 11/90 for Saturday, and 4/90 for Sunday. Then, within the selected day, the employee's scheduled reading period is determined by a random selection of a two-hour interval (first, second, third, or last) over the employee's actual tour of duty. For supervisors, clerks, and mail handlers, the probability of selection is (5/21, 5/21, 5/21, 6/21) respectively. Finally, a random time is selected within the selected interval with a probability of 1/120.

D. Cost Estimation

The IOCS Non-Cluster cost weighting factor is derived from standard design-based weights and national level accrued quarterly cost data for the crafts eligible for IOCS Non-Cluster sampling. The cost weighting factor is constructed so that weighted sums of IOCS Non-Cluster data produce cost estimates consistent with Trial Balance accrued costs by quarter.

1. Design Based Weight

The design based weights, W_{hijk}, are developed from the sampling design:

$$W_{hijk} = \frac{1}{P_h} * \frac{1}{P_{hijk}} * \frac{1}{P_D} * \frac{1}{P_R} * \frac{1}{P_T}$$

where

P_h = n_h / N_h , the ratio of sample offices, n_h, to total offices, N_h, for CAG group h

P_{hijk} = weekly sampling rate for employee k at pay location j, craft i, CAG group h

P_D = selection probability for the day of week

P_R = selection probability for the reading period

P_T = selection probability for the instant of time for observation

W_{hijk} = design based weight for employee k at pay location j, craft i, CAG group h

2. Cost Weighting Factor

The cost weighting factor "COST-BASED WEIGHT" is a dollar weight. Total accrued cost for the stratum is distributed to each employee in proportion to the employee's design weight relative to the total design weight for the stratum.

$$CW_{hijk} = \frac{W_{hijk}}{\sum_j \sum_k W_{hijk}} C_{hi},$$

where
CW_{hijk} = cost-based weight for employee k at pay location j, craft i, CAG group h, and C_{hi} = accrued cost for craft i, CAG group h

3. The Heavy/Light Weight

For computational purposes, a relative or scaled design based weight, the Heavy/Light weight, is saved on the data record and used for computing the cost weighting factor. The Heavy/Light weight is the ratio of the design weight W_{hijk} to a standard weight.[2] Its value is one for regular observations, and varies for observations which were selected with probabilities different than the standard probability within a CAG/Craft group. For example, if employees in a particular CAG/Craft group are normally selected with probability 0.03, but employees in one pay location are selected with probability 0.06, then the heavy/light weight for employees in that pay location would be ½, since weights are the reciprocals of the probabilities of selection.

As shown below, the use of this heavy/light weight rather than the design weight does not affect the value of CW_{hijk}, since the standard weight is the same for all observations within a CAG/Craft group.

Let
W_{hi}^{s} = the standard weight for CAG group *h* craft *i*, and
$W_{hijk}^{*} = W_{hijk} / W_{hi}^{s}$ = the heavy/light weight.
Then substituting W_{hijk}^{*} for W_{hijk} in the formula for CW_{hijk}, above, yields

$$CW_{hijk} = \frac{W_{hijk}^{*}}{\sum_j \sum_k W_{hijk}^{*}} C_{hi} = \frac{(W_{hijk} / W_{hi}^{s})}{\sum_j \sum_k (W_{hijk} / W_{hi}^{s})} C_{hi} = \frac{W_{hijk}}{\sum_j \sum_k W_{hijk}} C_{hi}.$$

The method of estimation assumes that the sample of offices in each CAG group constitutes an equal probability sample. It also assumes nonresponse is random, or independent of what is being estimated, and can therefore be regarded as constituting a simple reduction in sample size.

[2]The standard weight for an observation that is tabulated in CAG group x refers to the design weight of an observation sampled at a CAG group x facility without pay location over-sampling, with reading number 1 or 2, and scheduled for Monday to Friday.

V. STATISTICAL STUDY DESIGN – IOCS-CLUSTER

The IOCS-Cluster subsystem is a continuous, ongoing statistical sampling system to estimate the costs of various activities performed by city carriers while working on the premises. The universe under study in IOCS-Cluster consists of all the work hours during a fiscal year for all city carriers.[3] The working time of carriers is partitioned into two sections for sampling: morning and afternoon.[4]

A. Morning Tests

It is a two-stage sampling with replacement. The data are collected on-site at delivery facilities by DCT.

1. First Stage Sample

The primary sampling unit is a finance number within a stratified sampling CAG group.[5] The frame is all finance numbers with any accrued city-carrier hours. Finance numbers are selected from the panel of finance numbers that is also used by IOCS Non-Cluster, using probability proportional to size (PPS) sampling with replacement based on the workhours from the two most recent pay periods.[6]

A list of possible delivery days (Monday through Saturdays, excluding holidays) is randomized and systematically assigned to selected finance numbers to determine the day on which the test will be conducted.

Table 4 summarizes the IOCS Cluster first-stage sample and universe sizes for onsite tests.

Table 4
IOCS Cluster – Onsite
First-Stage Universe and Sample
Fiscal Year 2022

CAG Group	Finance Number Frame	Sampled Finance Numbers	Scheduled Tests
A/B	1,478	784	1,198
C	1,059	329	1,000
D	632	98	696
E	1,190	165	599

[3] While the universe is considered all workhours, only TACS workhours are incorporated in IOCS-Cluster.

[4] CAG or CAG Group is also factored into the sample partitioning. Morning tests are drawn at a CAG and CAG group level. CAGs A-B and CAGs H-L, are grouped for sampling purposes, while all other CAGs are sampled individually. Afternoon tests are drawn in two CAG groups: CAGs A-C and CAGs D-L. All post-stratification is done at an individual CAG level, except CAG H represents H-L.

[5] CAGs A – B and H – L are grouped together. Other CAGs are treated as individual strata.

[6] Time is the base unit of measure in the weight of the size. For example, an office with two hours of accrued time has twice the probability of being selected versus an office with one hour of accrued time.

F	1,450	78	320
G	1,549	45	120
H-L	843	27	60
Total Onsite	8,201	1,526	3,993

2. Second Stage Sample

The secondary sampling unit is the individual carrier. Before the test begins, the data collector identifies all city carriers who will be working (clocked into) the tested finance number that morning. Out of all available carriers in the finance number (a cluster), the CODES software will randomly select six carriers as a sample.[7] As soon as carriers start working, the data collector will begin the test and systematically sample these six carriers every five minutes or ten minutes, depending on the local information of the facilities and the amount of time required to perform the carrier readings. Data collectors continue conducting IOCS readings until 1100.[8]

3. Estimation

Let

i	finance number to test, within stratum
j	craft subgroup (full-time, part-time/transitional)
s	Sampling CAG group (A/B, C, D, E, F, G, H/J/K/L) in the morning test sampling)
k	Individual CAG (A, B, C, D, E, F, G, H) for cost allocation during post-stratification
l	route group (regular, SPR)
N_s	Number of tests in each CAG Group
nis	Total number of non-stop carrier tallies in the finance No. i of CAG Groups
H_{is}^{Samp}	TACS hours for a Finance Number in two pay periods within a CAG Group in sampling selection
H_s^{Samp}	Total TACS hours in two pay periods within a CAG Group in sampling selection
$\overline{H_s^{Samp}}$	Average TACS hours for all Finance Numbers in two pay periods within a CAG Group in sampling selection
H_{is}^{Quar}	TACS hours for a Finance Number during the full quarter within a sampling CAG Group
$\overline{H_s^{Quar}}$	Average TACS hours for all Finance Numbers during the full quarter within a sampling CAG Group
RWis	Reading weight, for individual samples;

[7] For finance numbers with six or fewer carriers clocking in, all carriers will be included in the sample.

[8] If all the carriers have left the premises, the DCT may conduct “street” readings in advance, after confirming with the supervisor that carriers will not be returning.

C cost from accounting (Cjk is cost by craft group and CAG)
CW cost weight assigned to each non-stop reading

For the morning test, the finance number is treated as the primary sampling unit (PSU) in the first stage. The finance number is randomly selected using PPS with respect to TACS hours for two recent pay periods within a CAG Group. The PSU weight is inversely proportional to the number of tests in each CAG Group. If a finance number is tested more than once, the PSU weights of the individual tests are summed together. PSU weights are further adjusted to reflect the share of workhours for the finance number in the full quarter relative to its share in the two pay periods that were used to generate the sample.

$$PSUweight_{is} = \frac{H_s^{Samp}}{\left(N_s * H_{is}^{Samp}\right)}$$

$$PSUweight_{is\_adj} = \sum_{\text{tests}\in i} PSUweight_{is} * \frac{\left(\frac{H_{is}^{Quar}}{H_s^{Quar}}\right)}{\left(\frac{H_{is}^{Samp}}{H_s^{Samp}}\right)}$$

In the second stage, the weight of the secondary sampling unit (SSU) within a PSU is calculated by taking into account the total number of readings from a finance number. E.g., if a finance number is tested multiple times, the readings from all tests are combined together.

$$SSUweight_{is} = \frac{H_{is}^{Samp}}{n_{is}}$$

Then the sampling weight of each reading is the product of $PSUweight_{is\_adj}$ and $SSUweight_{is}$.

$$RW_{is} = PSUweight_{is\_adj} * SSUweight_{is}$$

We obtain the control total costs for post-stratification using TACS hours by craft group, individual CAG, and route group, applied to total direct labor costs from accounting systems.

$$C_{jkl} = \frac{H_{jkl}}{H_{jk}} * C_{jk}$$

Finally, we convert the tally reading weights into cost weights. This is done for each combination of craft group, individual CAG, and route group separately.

$$CW_{ijkl} = \frac{RW_{is}}{\sum_{jkl} RW_{is}} * C_{jkl}$$

Note $\sum_{jkl} RW_{is}$ is the sum of all reading weights within a craft, individual CAG and route group

B. Afternoon Tests

It is a two-stage sampling with replacement. Tests are conducted via telephone by DCT throughout a district.

1. First Stage Sample

The primary sampling unit is an entire district within a stratified sampling CAG group.[9] The frame is all district finance numbers with accrued city-carrier hours. A district is defined as the set of finance numbers that fall under the same supervision. District finance numbers are selected from the panel of finance numbers that is also used by IOCS Non-Cluster, using probability proportional to size (PPS) sampling with replacement based on the workhours from the two pay periods.[10]

A list of possible delivery days (Monday through Saturdays, excluding holidays) and possible hour time blocks (starting with 1100-1200 and ending at 1800-1900) is randomized and systematically assigned to selected districts to determine the day on which the test will be conducted.

Table 5 summarizes the IOCS-Cluster first-stage sample and universe sizes for phone tests.

Table 5
IOCS Cluster - Phone
First-Stage Universe and Sample
Fiscal Year 2022

CAG Group	District Time Block Frame	Sampled District Time Blocks	Scheduled Tests
A-C	408	326	716
D-L	392	303	686
Total Phone	800	629	1,402

2. Second Stage Sample

The secondary sampling unit is the individual carrier. Once the CODES software is initialized, it will randomly select 30 city-carriers that belong to the test district. The data collector will spend the next hour to contact each of the carriers sampled and conduct IOCS readings. The test is completed once readings have

[9] CAGs A – C and D – L are grouped together.

[10] Time is the base unit of measure in the weight of the size. For example a district with 200 hours of accrued time has twice the probability of being selected versus a district with 100 hours of accrued time.

been conducted on all 30 sampled carriers or after the one hour test interval has passed.

3. Estimation

Let

i	District to test, within stratum
j	craft subgroup (full-time, part-time/transitional)
s	Sampling CAG group (A/B/C as large CAG and D/E/F/G/H as small CAG in the afternoon test sampling)
k	Individual CAG (A, B, C, D, E, F, G, H) for cost allocation during post-stratification
l	route group (regular, SPR)
N_s	Number of tests in each CAG Group
n_{is}	Total number of non-stop carrier tallies in District i of CAG Groups
H_{is}^{Samp}	TACS hours for a District in two pay periods within a CAG Group in sampling selection
H_s^{Samp}	Total TACS hours in two pay periods within a CAG Group in sampling selection
$\overline{H_s^{Samp}}$	Average TACS hours for all Districts in two pay periods within a CAG Group in sampling selection
H_{is}^{Quar}	TACS hours for a District during the full quarter within a sampling CAG Group
$\overline{H_s^{Quar}}$	Average TACS hours for all Districts during the full quarter within a sampling CAG Group
RW_{is}	Reading weight, for individual samples
C	cost from accounting (C_{jk} is cost by craft group and individual CAG)
CW	cost weight assigned to each non-stop reading

For the afternoon sampling, the district is treated as the primary sampling unit (PSU) in the first stage. The district is randomly selected using PPS with respect to TACS hours for two pay periods within a CAG Group. The PSU weights for all tests within a district are summed together. PSU weights are further adjusted to reflect the share of workhours for the district in the full quarter relative to its share from the two pay periods that were used to generate the sample.

$$PSUweight_{is} = \frac{H_s^{Samp}}{\left(N_s * H_{is}^{Samp}\right)}$$

$$PSUweight_{ik\_adj} = \sum_{\text{tests}\in i} PSUweight_{is} * \frac{\left(\frac{H_{is}^{Quar}}{H_{s}^{Quar}}\right)}{\left(\frac{H_{is}^{Samp}}{H_{s}^{Samp}}\right)}$$

In the second stage, the weight of the secondary sampling unit (SSU) within a PSU is calculated by taking into account the total number of readings from a district. If a district is tested multiple times, the readings from all tests are combined together.

$$SSUweight_{is} = \frac{H_{is}^{Quar}}{n_{is}}$$

Then the sampling weight of each reading is the product of $PSUweight_{is\_adj}$ and $SSUweight_{is}$.

$$RW_{is} = PSUweight_{is\_adj} * SSUweight_{is}$$

For the cost analysis in the afternoon testing, we post-stratify the tallies by individual CAG. This addresses the issue that the percentage of carriers in the IOCS panel varies by CAG, even within each sampling CAG Group.

We obtain the control total costs using TACS hours by craft group, individual CAG, and route group, applied to total direct labor costs from accounting systems.

$$C_{jkl} = \frac{H_{jkl}}{H_{jk}} * C_{jk}$$

Finally, we convert the tally reading weights into cost weights. This is done by each combination of craft group, individual CAG, and route group separately.

$$CW_{ijkl} = \frac{RW_{is}}{\sum_{jkl} RW_{is}} * C_{jkl}$$

Note $\sum_{jkl} RW_{is}$ is the sum of all reading weights within a craft, individual CAG and route group.

C. Carriers Clocked as Supervisors

For the small number of carriers who are acting as supervisors when sampled, cost control totals are developed based on TACS data summarizing clocked supervisor workhours by base craft group. The total costs are distributed to all readings within each time stratum and CAG Group.[11]

[11] CAGs A – C and D – L are group together for weighting. There is insufficient data to fully allocate accrued costs by individual CAG.

1. Estimation

Let

t	time stratum (morning/afternoon)
k	CAG group (A/B/C as large CAG and D/E/F/G/H/J/K/L as small CAG in the afternoon tests)
j	base craft subgroup (full-time carrier, part-time/transitional carrier)
n_{tk}	Total number of non-stop carrier tallies in the time stratum t of CAG Group k
RW_{tk}	Reading weight, for individual samples
C	cost from accounting for all supervisors (C_{tk} is cost by time stratum and CAG Group for carriers acting as supervisors)
H	TACS hours for all supervisors (H_{tk} is the hours by time stratum and CAG group for carriers acting as supervisors)
CW	cost weight assigned to each non-stop reading

The sampling weight of each reading is

$$RW_{tk} = \frac{1}{n_{tk}}$$

We obtain the control total costs for post-stratification for carriers acting as supervisors by using TACS hours for carriers acting as supervisors by CAG group and time stratum applied to total direct labor costs from accounting systems for all supervisors.

$$C_{tk} = \frac{H_{tk}}{H} * \ C$$

Finally, we combine the tally reading weights and cost weights. This is done by each combination of time stratum and CAG group separately.

$$CW_{tk} = \frac{1}{n_{tk}} * \ C_{tk}$$

VI. PROGRAM DOCUMENTATION

The programs that assign activity codes, basic function, operation/route codes and that perform cost estimation, together with programs that summarize TACS workhours, are documented in this section. Copies of the SAS programs and JCL are provided electronically in the accompanying zip file.

ALB040 - Program

The central function of this program is to assign initial four-digit activity codes for labor activities or products and to assign up to five special service codes. In addition, it assigns initial basic function and operation/route codes.

Inputs are:

- IOCS tally data;
- Periodicals data (ISSN, Publication No.);
- ZIP Code to County mapping;
- Postal Rates;
- Barcode Service Type Code mappings.

Output is a file of IOCS tally data with activity code, basic function and operation/route codes assigned, and with coded extra services.

ALB060 - Program

The main function of this SAS program is to perform edit and consistency checking. It checks the validity of certain data and checks certain related fields within the record for consistency. Records that fail the checks are assigned an error code and written to an error file for later correction, while remaining records are written to a “clean records” file. This program is applied several times in an iterative cycle with program ALB078.

Inputs are:

- IOCS tally data, either from ALB040 or from ALB078;
- Finance numbers in the IOCS panel;
- Tables of activity codes, extra service codes, operation/route codes, and country codes.

Output consists of two files, one with tallies that are clean, and one with tallies with data inconsistencies to be resolved.

ALB078 - Program

This is a SAS error correction program. Its purpose is to resolve data inconsistencies that lead to the error codes assigned by ALB060. It is applied several times in an iterative cycle with program ALB060.

Input is the file of tallies with data inconsistencies from ALB060. Output is a file of these tallies with updates and corrections.

ALB080 - Program

This program applies encirclement rules, assigning costs to extra services when appropriate. The previous activity code of the parent piece is overwritten, replaced by the activity code of the encircled extra service.

Inputs are the files of tallies output from programs ALB060 and ALB078.

Outputs are the IOCS tallies with activity codes encircled when appropriate, in both SAS and flat files.

External review

Tallies are also reviewed externally. These checks include: validation of Periodicals titles; specialized validation of international mail checking postage, markings and barcodes; validation of data using scanned barcodes, and review of anomaly log entries.

TACSUMQX

The function of the **TAC**S **Sum**mary **Q**uarterly (TACSUMQX) program is to summarize TACS data by day of the week, base craft group, craft group, finance number, LDC group, SPR season, and time split.

Inputs are files of individual TACS workhours records.

Outputs are summaries of TACS workhours for each finance number, in both SAS and flat files.

CAGTACQX

The function of the **CAG TAC**S **Q**uarterly (CAGTACQX) program is to 1) map finance numbers to CAG and 2) summarize TACS data by CAG. The data is summarized by day of the week, base craft group, craft group, LDC group, SPR season, time split, and CAG.

Inputs are:

TACS workhour summaries by finance number from TACSUMQX;
Lists of finance numbers with corresponding CAG.

Outputs are summaries of TACS workhours by CAG, in both SAS and flat files.

ATCOSTQX

The program applies the TACS summaries to the quarterly Post Office accrued expense data by craft and CAG for City Carriers including City Carriers clocking as Supervisors. The data is summarized by CAG, finance number category, base craft group, craft group, time of day group, day of the week, and route group.

Inputs are:

Summary file of TACS workhours from program CAGTACQX;
Files of Post Office accrued expense data by craft and CAG.

Outputs are costs by craft and CAG in a SAS dataset.

SPRPOOLQ

The program generates the control total costs by cost pool and workhours by season for SPR. Data are summarized by CAG, craft group, day of the week group, SPR season, activity group, and LDC.

Inputs are:

Lists of finance numbers with corresponding CAG.
Summary file of TACS workhours from program CAGTACQX;
Files of Post Office accrued expense data by craft and CAG.

Outputs are costs by SPR cost pools in both SAS and flat files.

ALB101/CL101 Program

The central purpose of this program is to produce IOCS cost weighting factors. It also merges in the results of the external international edit and the external Periodicals review, and performs corrections to some activity codes. The IOCS cost weighting factor is derived from standard design-based weights and national level accrued quarterly cost data for the crafts eligible for IOCS sampling. The cost weighting factor is constructed so that weighted sums of IOCS data produce cost estimates consistent with trial balance accrued costs by quarter. For carriers, tally cost weights are developed only for readings conducted from Monday to Saturday.

Inputs are:

IOCS tally files that were output from program ALB080;
List of finance numbers with corresponding CAG group/Finance group codes;
List of finance numbers with updated CAG and weighting factors;
Files of Post Office accrued expense data by craft and CAG group;
Additional expense data by route, day of week and time of day groups;
Periodicals tallies after external review;
International tallies after external review;
Edited tallies from external review of barcode scans;
Edited tallies from external review of anomaly log;
Sampling rate data used in sample selection for regular offices;
Sample rate data used in sample select for heavy/light offices;
Tallies of supervisors with automatically coded activity codes.

Outputs are:

IOCS tally files with cost weights assigned and with edits and automatically assigned activity codes incorporated;
File of dollar values by shape for products with mixed mail costs distributed in ALB103/CL103.

ALB103 - Program

SAS program, IOCS Non-Cluster ALB103 is executed to 1) generate IOCS records representing counted mixed mail for counted items and 2) add detailed international activity codes.

Inputs are:

IOCS Non-Cluster tally file from ALB101;
Detail data records for counted mixed mail;
Costs by product and shape from ALB101.

Outputs are the IOCS tallies with additional records for counted mixed mail and with additional detail for international tallies. This output is in SAS and flat files.

CL103 - Program

SAS program, IOCS Cluster CL103 is executed to add detailed international activity codes.

Inputs are:

IOCS-Cluster tally files from CL101.

Outputs are the IOCS tallies with additional detail for international tallies. This output is in SAS and flat files.

ALB104 – Program

This program adjusts the cost weights for IOCS Non-Cluster supervisor customer service Sunday/Holiday tallies using TACS workhours by CAG group. CAGs with any empty cells, with no tallies, are automatically grouped with data from other CAGs that do have data available.

Inputs are:

IOCS Non-Cluster tally file from ALB103;
Summary file of TACS workhours from program CAGTACS;
Files of Post Office accrued expense data by craft and CAG.

Outputs are the IOCS tallies with adjusted cost weights, in SAS and flat files.

ALB106 - Program

This program reformats and summarizes the IOCS tally data into the form required by the CARMM procedure. It also produces several craft level reports for input into CRA spreadsheets.

The summary output file drops basic function 4 records, then summarizes tallies and dollars for groups defined by CAG group, Finance grouping, craft code designation, operation/route code, basic function, and activity code.

CS2SUPV - Program

This program produces a report on split supervisor activity codes. The results are input to the C/S 2 spreadsheets.

- There are two analyses of activity code 7470 (supervision of mixed clerk/mail handler activities). The first reports on certain activities that should *not* be included—i.e., carrier activities (Q15D), other craft-level employees (Q15F), and no craft-level employees (Q15G). If none of these are found, "NO OTHERS" will be 100.0 percent. The second analysis is used to reallocate a portion of 7470 to mail processing, window, and administrative activities (Q15E1, Q15E3).

- An analysis of activity code 7635 (supervision of two or more clerk/mail handler activities) verifies that very few tallies include administrative/other activities (Q15E1) or other craft-level employees (Q15F).

- There are two analyses of activity code 7637 (supervision of clerks/mail handlers and at least one carrier). The first analysis determines the proportions of the various activities assigned to mail processing, window and admin (Q15E1,Q15E3,Q15F,Q15G). The second analysis narrows the mail processing activities to bulk mail acceptance, collection/preparation, processing/distribution, and miscellaneous (Q15E1).

CS3EQUIP - Program

This program develops distribution keys for mail processing equipment and training. The program selects all tallies for which:

- Employee is a clerk or mail handler
- Employee is assigned a direct mail activity code
- Employee is in a mail-processing related operation

The selected records are divided into types of equipment being used, type of manual operation being performed, NDC, parcels, and other mail processing activities. They are then assigned to product based on activity code, and reports are written.

CLCARMM - Program

The function of the City **Car**rier **M**ixed **M**ail (CARMM) Cost Distribution program is to distribute mixed mail costs to direct mail activity codes and to produce a variety of summary reports as output. The inputs are: 1) cost data summarized by ALB106; 2) a table mapping direct mail activity codes to mixed mail codes.

APPENDIX A: IOCS ZIP FILE CONTENTS

The associated zip file contains the following.

1. Directory Data\ contains the IOCS Non-Cluster (NC) and Cluster (CL): PC-SAS datasets: PRCPubNC22.sas7bdat, PRCPubCL22.sas7bdat; flat files PRCPub22FlatNC.dat, PRCPub22FlatCL.dat; and macros to read the flat files PRCPUB22NC _FLTFMT.txt, PRCPUB22CL_FLTFMT.txt.
2. Directory SASPrograms\ contains the SAS programs used to assign activity codes, basic function and operation/route numbers, and to estimate costs.
3. Directory JCL\ contains the JCL used to run the SAS programs.
4. Directory ALB\HQ624D01\ contains the total dollars by craft and CAG group that are distributed by IOCS.
5. Directory ALB\TACSCAG\ contains the summaries of TACS workhours by CAG.
6. Files IOCSNon-ClusterDataDictionaryFY22.xlsx and IOCSClusterDataDictionaryFY22.xlsx describe the variables in the IOCS Non-Cluster and Cluster data files, respectively.
7. File MASTER.CODES.FY22 is a list of codes used in IOCS.
8. File FY22.MXMAIL.DATA is the mapping of mixed to direct mail activity codes for CARMM.
9. Files ReadPRCPubOutput22NC.txt and ReadPRCPubOutput22CL.txt are the outputs of the Non-Cluster (NC) and Cluster (CL) programs that list the variables in the PRCPubNC22 and PRCPubCL22 datasets and print the contents of 10 records.
10. File IOCSDataEntryFlowchartFY22.xlsx is the flowchart describing the CODES software survey instrument.
11. File “IOCS CVs FY22 Public.xlsx” has the IOCS CVs.
12. File “COD_Cost_Coverage_FY22.xlsx” provides the analysis of COD ordered by the Commission.[12]
13. File “SPRPoolSumm_FY22.xlsx” provides cost totals for SPR cost pools and workhours by SPR Season to weight variabilities of non-peak seasons, as ordered by the Commission.[13]

Note: The data file contains data elements of the IOCS data file used for the development of the Fiscal Year 2022 CRA. It was developed by dropping variables not used in development of the CRA, and recoding variables containing sensitive information.

The following IOCS Non-Cluster data fields were recoded:

F1 – the second character of F1 (area identifier)
F2 – finance number
Q01 – employee identification number
NewFN – updated finance number

[12] FY 2016 Annual Compliance Determination (March 28, 2017), Chapter 3 at 62.
[13] Order No. 5991 (September 30, 2021), p. 17.

ZIP code fields

The following IOCS Cluster data fields were recoded:

TestID – the last 6 digits of TestID (Finance Number)
FinanceNum – finance number
EmployeeEIN – employee identification number of the employee sampled
ZIP code fields

The public datasets have been further modified by assigning activity code x475 to all domestic competitive products, recoding International products, and dropping variables that could identify these products.